

SYSTEMATIC STUDIES ON *OENOTHERA*,—V.

OE. ROBINSONII AND OE. CLEISTANTHA, SPP. NOVV.

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(Plate 111.)

It has been shown ¹ that "*Oenothera cruciata*" of the Manuals is an aggregate of genetically unrelated elements with little morphological similarity aside from their linear petals. A number of these elements have been separately defined, namely, *Oe. cruciata* Nutt., *Oe. venosa* Shull & Bartlett, *Oe. atrovirens* Shull & Bartlett, and *Oe. stenomeres* Bartlett. Moreover, Bicknell ² has described a cruciate-flowered ally of *Oe. Oakesiana*, *Oe. stenopetala* Bicknell, thus greatly strengthening the evidence that the character of cruciateness has originated independently in several lines of descent.

In this article two more cruciate species are proposed, *Oe. Robinsonii* and *Oe. cleistantha*. The former has figured somewhat in genetical literature as an "elementary species of *Oe. cruciata*." It was originally collected by Robinson in 1902 at Jaffrey, New Hampshire, and sent to de Vries. For several years prior to 1913 the strain had been lost from the experiment gardens, but Dr. Robinson very kindly collected it again at Jaffrey and sent seeds to the writer. These were planted last year, and gave a uniform culture of very slender-flowered plants which agree with all that we know of the strain originally cultivated by de Vries.

There has been some confusion in the literature between *Oe. Robinsonii* and a form described by MacDougal which originated from seeds collected at Hudson Falls (Sandy Hills), New York, the type locality of *Oe. venosa* and *Oe. atrovirens*. Since my former article on the cruciate forms (l. c.) was published, I have received numerous seed collections from Mr. Stewart Henry Burnham, of Hudson Falls, which may make it possible to clear up this confusion as well as to determine whether *Oe. venosa* and *Oe. atrovirens* respectively are more closely

¹ Bartlett, H. H. An account of the cruciate-flowered *Oenotheras* of the subgenus *Onagra*. *Am. Journ. Bot.* I (1914) pp. 226-243.

² Bicknell, E. P. The ferns and flowering plants of Nantucket — XII. *Bull. Torr. Bot. Club*, XLI (1914) pp. 71-87.

allied to broad-petaled species of that region than they are to one another. Mr. Burnham was the original collector of *Oe. venosa* and *Oe. atrovirens* and obtained the seeds through which these species were introduced into our experiment gardens. The new seed collections are from the same locality as those of 1903. Since Mr. Burnham has sent entire inflorescences it seems safe to say, even before the seeds are planted, that *Oe. Robinsonii* is not among the forms which he has collected. Nevertheless, there is enough likeness between *Oe. venosa* and *Oe. Robinsonii* so that a close genetic relationship between them seems not unlikely.

Oenothera cleistantha was collected about ten years ago at Huntington, Long Island, by Dr. Geo. Harrison Shull. He has grown it extensively for experimental purposes, and the writer has also had it under observation during one season. Unlike *Oe. Robinsonii*, it has no obvious affinity with any *Onagra* thus far described, either cruciate or broad-petaled. In general appearance it is more similar to the *Oe. venosa* of northern New York than to the *Oe. stenomeres* of Maryland, but genetically it is probably not closely related to either.

Oenothera Robinsonii Bartlett sp. nov. Biennis. Rosula matura ca. 50 cm. diametro; foliis maximis 30×4 cm., mediocribus $20-25 \times 3.5$ cm., viridibus, longe petiolatis, spatulato-lanceolatis, modice bullatis, ad basin versus argute dentatis, utrinque exigue pubescentibus; pilis brevibus appressis. Planta matura ca. 60 cm. alta. Caulis proprius sursum ramos floriferos deorsum ramos abortivos ferens. Rami radicales numerosi (10-20) cauli proprio similes. Caules latere insolito rubri, altrorsus maculosi, tuberculato-pilosi, pilis ascendentibus, tuberculis cauli concoloribus. Folia inferiora caulina eis rosulae similia, ca. 13×3 cm., media ca. 10×2.2 cm. Bracteae foliaceae, persistentes, ovariis longiores sed fructibus maturis plerumque breviores, anguste lanceolatae, minute puberulae, supra pilis aliis acutis, aliis viscidis cylindricis, apice rotundatis, subtus viscidis solis vestitae. Hypanthium gracillimum 33-40 mm. longum, 1.5 mm. crassum, pilis aliis paucissimis mediocribus ascendentibus, aliis numerosis brevibus erectis viscidis tectum. Calyx proprius pubescentia hypanthio similis, inexpansus gemmam prismaticam quadrangulam 15 mm. longam 3.5 mm. crassam formans, apicibus liberis 3 mm. longis, paulum infraterminalibus, erectis, parallelis, sparsim appressopubescentibus. Petala margine viridi-flavescentia, medio flava, staminibus breviora, 8 mm. longa, 2 mm. lata, supra glabra, subtus sparsissime viscido-puberula. Stigma antheris 5-6 mm. longis circumdatum. Ovarium 10 mm. longum gracillimum, pilis et longis ascendentibus rubro-vel viridi-tuberculatis et brevibus erectis densis viscidis tectum. Fructus 26 mm. longi, prope basin 6 mm. crassi,

apicem versus sensim angustati, minute viscido-puberuli, pubescentes, et sparsim tuberculato-pilosi, tuberculis viridibus; apicibus productis brevissimis truncatis vel paululo emarginatis.— Cultivated from seeds collected at Jaffrey, New Hampshire, by B. L. Robinson; garden specimens, *Bartlett* 3505, 3509, 3517, 3669, 3670. *Oe. Robinsonii* differs from *Oe. venosa* chiefly in the smaller size of the former, in the more sharply dentate leaves, the narrower bracts, the dense erect viscid puberulence of the longer, more slender buds and the shorter calyx tips. Most of these differences are obscure in herbarium material. The range of variation in bud length, for example, overlaps in the two species. Nevertheless the difference is striking enough in plants cultivated under identical conditions, as were those shown in Plate 111.

Oenothera cleistantha Shull & Bartlett sp. nov. Biennis. Rosulae folia oblanceolata, ad petiolum versus distanter et acute sinuato-dentata, maxima ca. 270×30 mm. Planta matura ca. 1 m. alta ex caule proprio obliquo et 10–15 ramis radicalibus constans. Caulis proprius infra inflorescentiam ca. 7 dm. longus, dense foliosus et ramosus, ramis 5–100 mm. longis, solum longioribus autumnno vergente floriferis; inflorescentia terminalis 3–4 dm. longa, sublaxa, simplex vel spicis 1–4 lateralibus brevibus praedita, juventate paululo nutans, aetate erecta. Rami radicales late patentés, caule proprio longiores (ca. 13–14 dm. longi) infra medium ramis 5–15 tertiariis floriferis, maximis 6 dm. longis praediti, sursum solum ramulos brevis foliosos non floriferos ferentes. Caulis coloribus viride et rubro maculosus, crispato-pubescentis et tuberculato-pilosus, tuberculis cauli concoloribus. Folia laete viridia, utrinque minute crispato-pubescentia, inferiora ca. 140×28 mm., media 100×22 mm. Bracteae patentés, inferiores foliosae lanceolatae ca. 42×13 mm., superiores fructibus dimidio longiores. Hypanthium gracillimum 33–36 mm. longum, 1.5 mm. crassum, sparsim patenter pilosum et viscido-puberulum. Flores saepissime cleistogami. Calyx proprius inexpansus subquadrangulus 14 mm. longus, 4 mm. crassus, pilis viridi-tuberculatis longis, prope hypanthium vel reflexis vel erectis, prope apicem ascendentibus; apicibus liberis basi distantibus, 3 mm. longis, parallelis. Petala 10 mm. longa, 2.5 mm. lata. Stigma antheris circumdatum. Ovarium 11×2.5 mm., dense pilosum et puberulum, pilis triformibus, I longissimis tuberculatis albis ascendentibus, II brevibus acutis crispatis, III brevissimis viscidis erectis. Fructus virides 30 mm. longi, prope basin 6.5 mm. crassi, apicem versus angustati, pubescentia ovario similes, subscabri, pilorum tuberculis viridibus; appendicibus productis 1 mm. longis, emarginatis.— Grown from seeds collected by Dr. Geo. H. Shull at Huntington, Long Island, N. Y.; garden specimens *Bartlett* 3511, 3557, 3592, 3646. The extreme leafiness and dense branching of this species are among its most striking characters. A more minute but very distinctive characteristic lies in the long hairs of the calyx, which are retrorse or perpendicular around the top

of the hypanthium, but elsewhere on the bud cone strongly ascending. As a rule the flower-buds never open.

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EXPLANATION OF PLATE 111.

- Fig. a. *Oenothera Robinsonii*. Inflorescence of main stem.
 Fig. b. *Oenothera Robinsonii*. Inflorescence of side branch (cf. fig. c).
 Fig. c. *Oenothera venosa*. Inflorescence of side branch (cf. fig. b).
 Fig. d. *Oenothera cleistantha*. Inflorescence of main stem, in fruit.
 Fig. e. *Oenothera cleistantha*. Inflorescence of side branch, in flower.

THE NORTH AMERICAN REPRESENTATIVES OF DRYOPTERIS SPINULOSA, VAR. DILATATA.

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THE present writer, who has rarely intruded upon the preserves of the fern-specialists, ventures with some trepidation to discuss a plant which has already had more than its full share of attention. But, in an endeavor to settle as exactly as possible the identities of all the vascular plants known from Newfoundland, he has found himself constantly perplexed by the current treatments of the plant variously known in eastern America as *Dryopteris spinulosa* (Müll.) Kuntze, var. *dilatata* (Hoffm.) Underw. or *Aspidium spinulosum* (Müll.) Sw., var. *dilatatum* (Hoffm.) Hook. or *Dryopteris dilatata* (Hoffm.) Gray.

It has long been known that the common broad-fronded plant of the Hudsonian and Canadian areas of eastern America, which passes as *Dryopteris spinulosa*, var. *dilatata*, has the indusia quite glabrous, in this character exactly coinciding with the somewhat narrower-fronded *D. spinulosa* and diverging from var. *dilatata* of Europe in which the indusia, as regularly described by European authors, have the margins glandular-ciliate. In fact, in some American manuals *D. spinulosa* and its var. *dilatata* (or *D. dilatata*) are separated from var. *intermedia* (or *D. intermedia*) by their glabrous indusia, as opposed to the distinctly glandular indusia of the latter plant. In view of this departure from the European type it seems somewhat strange that American fern-students have clung so tenaciously to the name of the